Below and Beyond the Surface

reconnecting Manhattan's subway network to the city above through reclamation of the street as a pedestrian zone

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Statement

Through culturally conscious design, Manhattan's subway network can transform into meaningful public space that connects the underground system and its travellers back to the rich city above. These spaces within the system can be transformed from univalent areas of infrastructure to multivalent public places.

Abstract

Rising housing prices in major cities are causing commuter numbers to increase exponentially and commutes are becoming an ever present and longer part of daily life. 52% of Manhattans weekday daytime population does not reside in Manhattan, meaning many people spend a large portion of their day commuting, typically underground in Manhattan's subway system (1). Use of these undergorund spaces is rising at an exponential rate, yet little has been done to improve the experience in these spaces. Commutes are monotonous parts of individual's daily routine. Thoughtful design of commuting spaces will create an environment people actually want to engage with and has the ability to bring people out of the technological world of their phone and provoke meaningful interaction, not only with other individuals, but with their surrounding environment. Exploration of what has been done successfully in existing public space at the surface, as well as identification of what is lacking will aid in creating meaningful space in the city's underground network.

Through specific design efforts, these spaces can become more than just mundane places to pass through mindlessly; they can become specific amenity spaces people do not have to go out of their way to experience and enjoy. Manhattan has an abundance of public spaces, but for those working a typical 9-5 plus day, those spaces may only be able to be enjoyed for a short hour lunch break. The underground network of New York's subway system is public space commuters already have to be in, therefore by giving these areas explicit design attention, public amenities are being brought to where people already have to be and already frequent.

Commuting spaces are underutilized as public space as they are treated as infrastructure instead of rich public spaces. Subway infrastructure in Manhattan needs to retain the cultural identity of the city it supports. By transforming underground subway networks into multivalent infrastructure, spaces within the network can begin to relate to the surface and therefore commuters can relate back to the city they spend so much time travelling beneath; these inhospitable spaces can begin to transform into places.

"One entered the city like a god; one scuttles in now like a rat."

-Vincent Scully, Professor Emeritus of Architecture, Yale University

Introduction: Multivalent Infrastructure

Infrastructures are the basic physical and organizational structures, facilities, and sysytems that enable the circulation of goods, knowlledge, people, and power. Infrastructure networks facilitate movement, whether that be the movement of goods, people, or ideas (2). When these networks are publice, they are not only utilized for thier sole purpose of moving something from one place to another, but create place from the residual areas within the system. These places forster social space and therefore integrate themselves into the identity of the city they support. Infrastructure throughout history has been directly ties to and representative of a culture's identity power, and ideals.

Historically multivalent networks of infrastructure like the Roman aqueducts and Indian stepwells promote the sophistication of the societeies that created them as well as demand the recognition of others (3). These networks also created gathering points of religious significance and an opportunity for people to come together to celebrate thier society. Structures like the Indian stepwells not only provided a water management solution, but were a part of India's architectural heritage, with thier decorated artworks and dedication to gods and association with temples.

Transportation systems are no different in thier connection to the societies they support. At the intersection of transportation and public space, transport spaces and systems are pervasive networks across cities that connect everyone in a society.

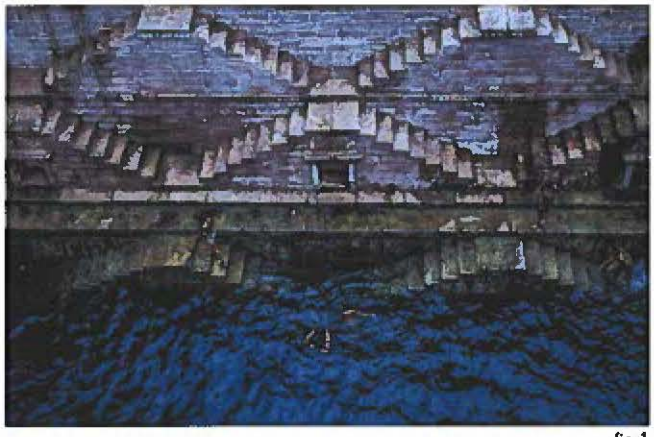


fig.1

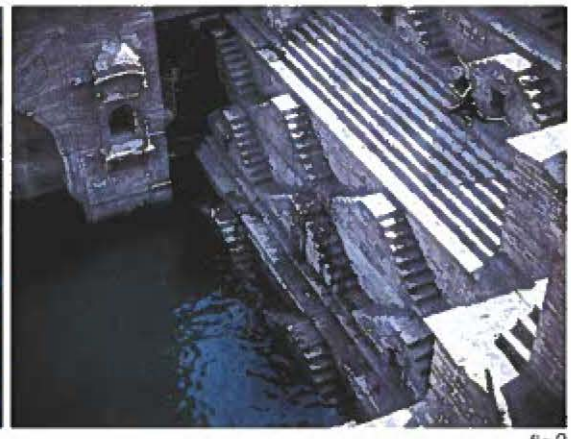


fig.2

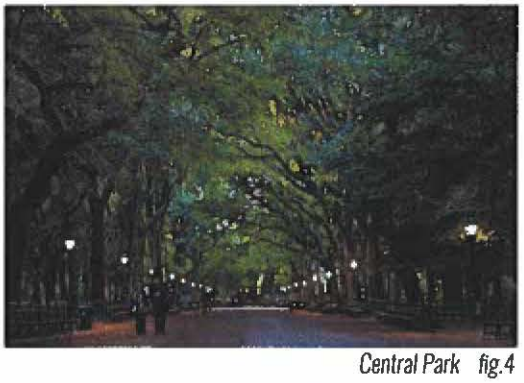
Indian stepwells are man made areas that penetrate the earth for water storage and irrigation. These sites go well beyond functioning merely as infrastructure in India and are a central part of its architectural heritage. They are sophisticated systems of drains, wells, and tanks with descending steps that can reach depths of over thirteen stories and accomodate the fluctuating water table. They first were constructed in 600 CE and continued up until 1900. They function as water infrastructure, but these decorated artworks also have religious and cultural importance. Many are situated next to temples and include carved shrines. They also have become local pools where children and adults alike will jump from the steep walls to land in the cool water below to combat India's heat (4).

Public Space in Manhattan

The Subway plays a crucial utilitarian role in New York City, but it is also a network of public space with its own set of unique characteristics. Subways are often thought of as a means of getting from point A to point B; the spaces within the subway network are seen as places to pass through, not to flock to. The widely recognized view of the New York City subway is transportation, but if this perspective could be shifted, shifted to recognize this network as vital, rich public space, underground subway spaces could begin to be seen in a new light. If these spaces could begin to be seen and explored as meaningful public space, the relationship of subway to city, user to subway, and user to user could be renewed and reimagined in a positive light. The subway system is more than just the network of infrastructure represented two dimensionally by intersecting colored lines on the MTA subway map, it is a three dimensional sensorial experience, a journey through rich, yet underappreciated, unexploited space. By making subway infrastructure multivalent, culturally specific places, the commuting experience can become a cognitive, engaging one that connects and celebrates to the cultural conditions of the city.

There is an abundance of public space at the surface of Manhattan, from outdoor parks, to indoor and outdoor plazas. However, they are all places one must make time to travel to. For an individual commuting into Manhattan, working a full time position, that may only mean an occasional lunch hour can be spent in these public spaces at the surface. A considerable amount of time for commuters is spent within the confines of the subway network, so by bringing the amenities and treatments given to public spaces at the surface down below ground level, individuals can get the most out of their commute and the space they already have to spend time in. Subway stations should provide inviting and dynamic spaces as well as promote a cultural connection to the city.

Zuccotti Park fig.3



Central Park fig.4

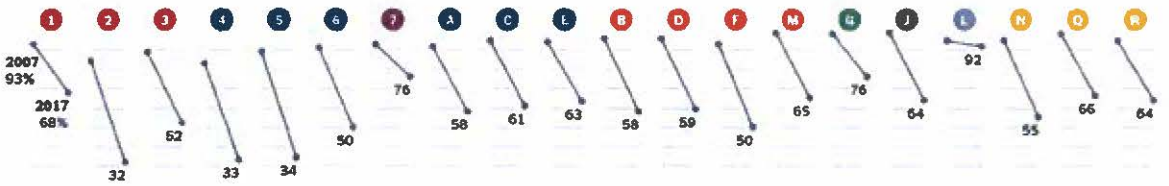
The Highline fig.5

fig.6

Public Spaces in Manhattan

Stress on the System: The Rise of Commuting

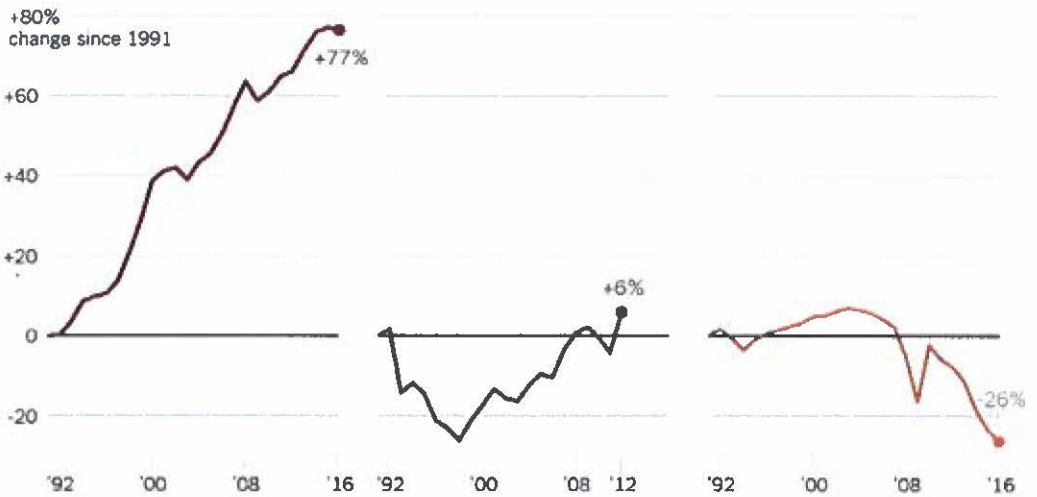
New York City's subway system provides service for an average five million individuals per day. Those individuals include commuters, residents, tourists, and visitors. Subway ridership has increased exponentially over the past two decades, however, when adjusting for inflation, the Metropolitan Transit Authority's (MTA) budget for maintenance has barely changed. New York's subway system has the worst on time performance of any major rapid transit system in the world with only 65% of weekday trains arriving to their destination on time (5). This overburdened system only extends the time commuters must spend within the underground network of the subway system of Manhattan. This network is an iconic staple of New York and is ingrained in New York's cultural image, however, the reality of the spaces within this network is that they are nothing to be celebrated.



On Time Performance of Subway Lines over Ten Years fig.7

50.1 % of subway riders Monday to Friday are commuters, entering Manhattan from outer boroughs (6). Increasing average housing prices and building density continue to drive those who work in Manhattan further and further away from the island. Commuters must spend large spans of their day in these dark, dank, crowded underground spaces. The reality of Manhattan is that housing prices are going to continue to soar, edging people out of their price ranges for housing. Those who can afford ot live in the area are choosing to live in other boroughs for more space and breathing room. Extended commutes are going to continue to rise, causing more time to be spent underground away from public amenities at the surface. By deliberately designing subway spaces, the commutes that are an unfortunate reality for millions of people can become less of a burden and be seen as an experience through public amenity space, instead of dull, uninviting infrastructure.

NYC SUBWAY STATISTICS 1991-2016



RIDERSHIP MAINTENANCE SPENDING ON-TIME PERFORMANCE

By Jasmine C. Lee | Source: Metropolitan Transportation Authority: National Transit Database *fig.8*

fig.9

fig.10

fig.11

fig.12

"They are important public spaces. They have a functional purpose that must be central to their design, yes, but we should take them as seriously as social spaces as well, just as we would other public spaces such as squares or parks. The energy we put into making public spaces attractive and interesting, and thus places that people want to be, is an expression of how much we value and respect the public as a whole, that we value community and society. There's no reason for a transit station to be dark and featureless."

-Professor Patricia Wood, York Univeristy

Penn Station 1910-1963

Penn Station today is the busiest terminal in North America, yet it offers only is a dark, undergorund maze to the millions of individuals that pass through (7). This transportation hub was once praised for its masterful Beaux-Arts style and commanding, evocative presence. In 1910, the station stood above ground on eight acres in midtown Manhattan (8). At the time, the main waiting room was the largest enclosed space in the city. Every space was bathed in natural light including the platform and concourse areas as the space was lit by an arching glass and steel roof. Penn Station was a gateway and evoked the sense of grandeur, power, and possibility associated with New York City. Charles McKim's design drew inspiration from Roman baths as well as European train stations of the time in order to create a true cultural landmark for the city. Just 50 years later, due to the rise of other forms of transportation and financial trouble, the station began to fall into disrepair and was ultimately torn down by 1963 and replaced with the underground system still in place today.

As a result of the station's destruction, the Landmarks Preservation Commission (LPC) was created. The LPC went on to save other great centers of cultural identity in the city, most notably Grand Central Station, which could have otherwise been lost in the 1970s had the LPC not granted it landmark status (9).

"To pass through Grand Central Terminal, one of New York's exalted public spaces, is an ennobling experience, a gift. To commute via the bowels of Penn Station, just a few blocks away, is a humiliation."

-Vincent Scully, Professor Emeritus of Architecture, Yale University

fig.13

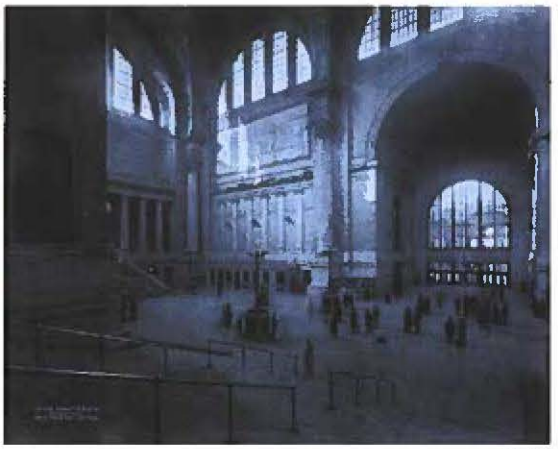


fig.14

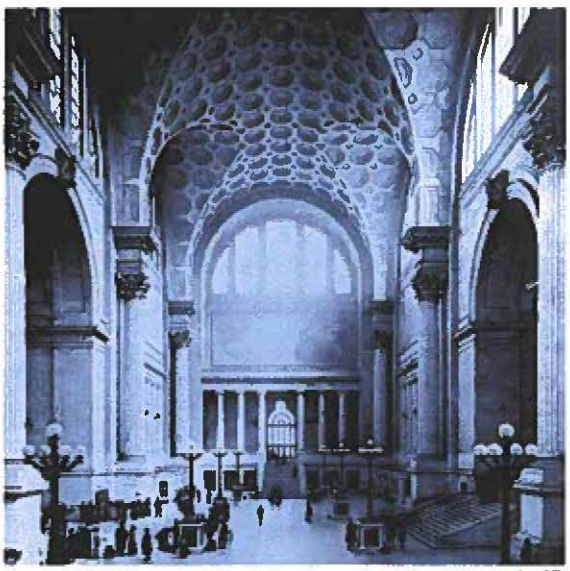


fig.15

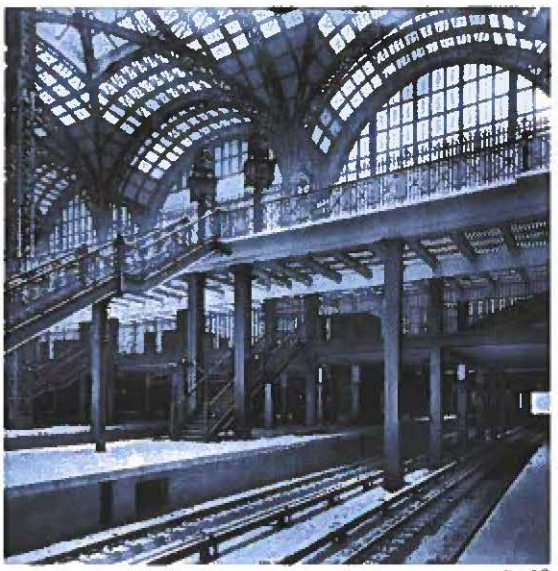


fig.16

City Hall Station

The first subway car to leave City Hall Station was in 1904, also known as the first subway stop in New York City. The subway station, despite only being in use until 1945, was one of architectural beauty (10). With its intricate architectural details, glass tiles, skylights, and chandeliers, the station bears little resemblance to stations created after it. The grandeur of the city's first subway stop was to reflect the grand system being implemented. Glass blocks embedded in the street above allowed for natural light to filter in. Despite the design efforts put into the station, it was decomissioned in 1945. The curved platform of the station mad eit so that only specially modified subway cars could stop at the station. The adjacent Brooklyn Bridge stop also contributed to the decline of the station's ridership. The Brooklyn Bridge station offered riders more direct access to the street (11).

Despite having been closed for over seventy years, the station continues to spark interest. Restricted tours take people down into the station to marvel at the kind of bebauty that only exists within this abandoned station. The City Hall stop piques interest because it is in such juxtaposition to modern subway stops.

fig.17

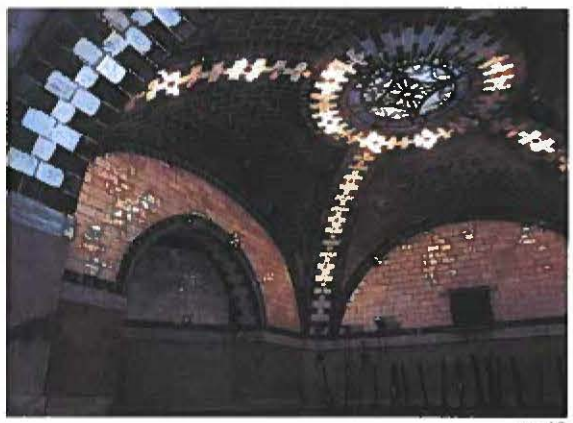


fig.18

fig.19

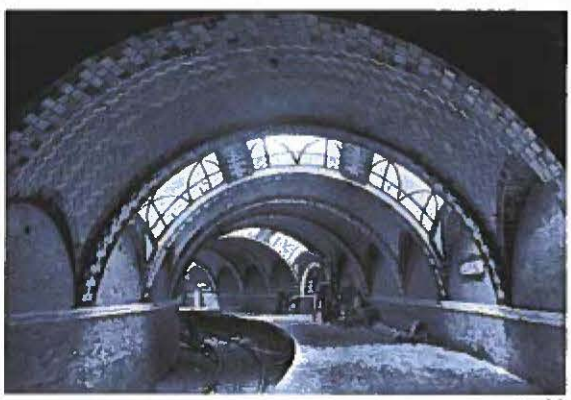


fig.20

Current Initiatives 02.5

MTA Arts and Design

Initiatives to improve the less than desirable conditions within the subways are in place, but many aspects of these initiatives miss the mark in terms of the goals they set. MTA Arts and Design was created in the 1980s and is responsible for overseeing artists and permanent artworks within subway and commuter rail stations (12). They have the goal of creating "meaningful connections among sites, neighborhoods, and people: as we as serve as a "diverse and beautiful underground art museum." While this goal is noble and needed, many of their initiatives act simply a band aid and do not address the root of the issue of the failing spaces.

fig.21

fig.22

The poster Program under the MTA Arts and Design was created "to celebrate the diverse communities that make up the New York region" and provide a "respite of engaging visual art" (13).The program provides exposure for local artists, but does little to enhance the experience of commuting through the subway. The art created for this program is randomly displayed in unused advertising space on subway platforms, in subway cars, and on buses, The illustrations posted provide a positive message, but provide little continuity or cohesiveness to actually impact the kind of population the subway network supports. Without any continuity, there is little enhancement done to the space to improve the commuter and travel experience.

MTA Arts and Design also manages the Music Under New York (MTA Music) program. More than 350 performers, exhibiting all types of music, participate in the program (14). This type of initiative starts to create a more engaging and experiential travel environment. Music performances give riders a moment of pause and break up the monotony of a daily commute. MTA Music begins to bring the culture of New York's music industry down from the streets and allows in to permeate into otherwise flavorless spaces.

Enhanced Station Initiative

Under Governor Andrew Cuomo, the Enhanced Station Initiative (ESI) was unveiled in 2016. The ongoing program plans to invest billions of dollars to renovate 33 of New York City's 472 subway stations (15). The plan includes new way-finding feature, both at street level, and underground, new lighting, artwork, tiling, WIFI, charging stations, and 1,025 redesigned subway tcars. The design for these stations is described by Governor Cuomo as "bold and visionary": the design reimagines the "quintessential commuter experience, incorporating best practices from global transit systems, and focusing on our core mission to renew, enhance, and expand" because "New York deserved a world-class transportation network, worthy of its role as the heartbeat of the 21st century economy" (16). The plans include many amenities and cosmetic fixes to enhance user experience, but do little to exhibit or promote the cultural character of New York or engage users with their surroundings (17). If Governor Cuomo wants the plan to highlight the subway network as a heartbeat of the city, then it must be connected to and reflective of the vivacity of the city at the street level.

The initiative has the goal of taking the "architectural legacy of stations" (18) into account and remaining sensitive to historical elements through the renovations, yet the released renderings are not reflective of that. The amenities being introduced are like flashy stickers. While the plan modernizes the stations, it does little ot contribute to a cultural, engaging commuter experiences "service and reliability shouldn't just be while passengers are on the train. It should be while they're on the platform" (19). Electronically connective and wayfinding elements are key to improving commuter experience, but they do little to connect users to the culture of the city found in such abundance at the surface.

Enhanced Station Initiative Rendering fig.23

Fulton Street Station

Fulton Center is a transit hub and retail center in lower Manhattan. The renovation of this station with Grimshaw Architects sought to bring natural light deep into the transit environment. It's dome interior offers a connection to the sky while offering a wayfinding element from street level. 1.4 billion dollars went into this project in order to create a more functional transit environment (20). While the MTA's main goal was to improve upon connectivity points, Grimshaw sought to improve the quality of space and had the main goal of penetrating light into each level of this structure as well as create a connection with the world above. The project relates back to the first Penn Station in that the main entry space is bathed in light. However, where the project falls short is in its ablity to bring light and ammenities past the turnstyles and onto the platforms.

The multilevel space that has been created is a transitional space from the street into the subway platforms and underground system. However, the design stops at the turnstyles. While there are shops and ammenities that cause people to linger, thier main goal is to get from the street to thier trains. The space is a threshold space. Underground, on the subway platforms are where people are forced to spend time; they must wait for thier trains on in that space. Fulton Station creates a sense of awe for individuals entering and leaving, but does little to improve space that people ultimately spend the bulk of thier time when utilizing the city's transportatino network.

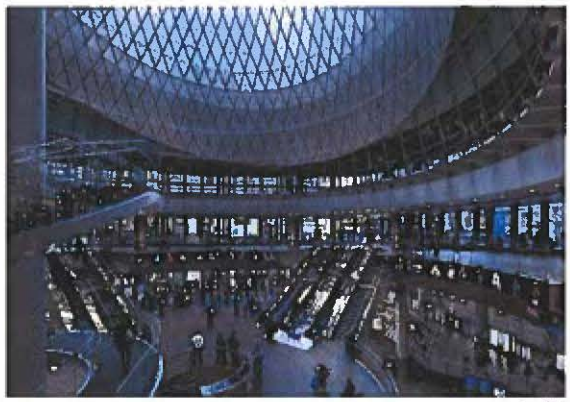


fig.24

fig.25

Daylight Analysis Diagram: Direct and Ambient Sunlight

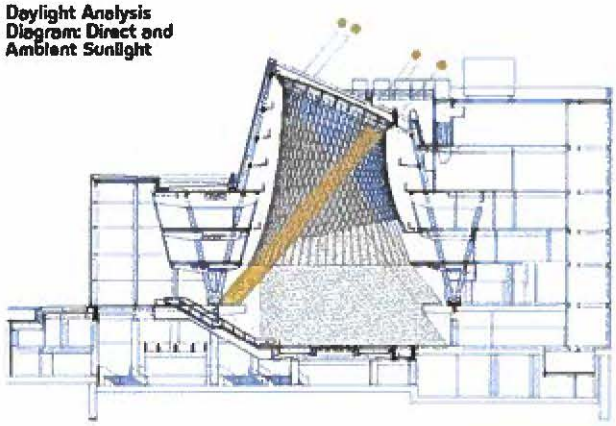


fig.26

fig.27

The Lowline

The Lowline is an underground park project under construction on the Lower East Side of Manhattan. The site was home to the historic Williamsburg Bridge Trolley terminal that was decommissioned in 1948 (21). The site sits directly adjacent to JMZ subway lines at the Essex Street subway stop facilitating interaction between the subway riders and park-goers. From October, 2015 to February, 2015 The Lowline Lab Exhibit provided free public space to show how the Lowline would function once fully constructed. Solar technology functions as "remote skylights" and allows light to be distributed underground to support photosynthesis which allowed for trees and other plant species to be grown in The Lab. The vision for this space is a "dynamic public space" that incorporates education into the program and links to the community. The Lab was a community and cultural space as well as a testing site (26) . This projects links to historic and existing infrastructure to create rich public space that will foster engagement from tourists, community members, and commuters.

fig.28

fig.29

fig.30

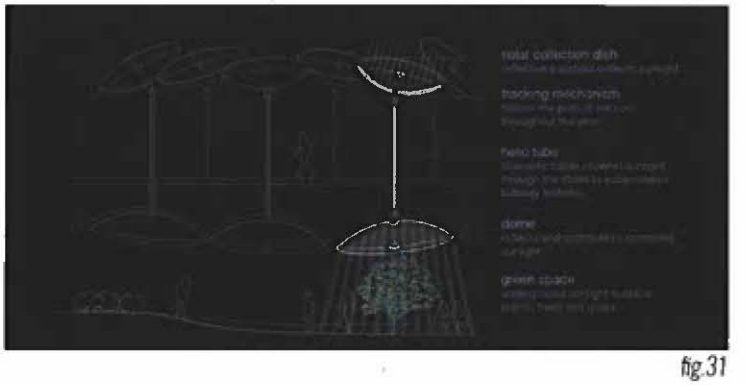
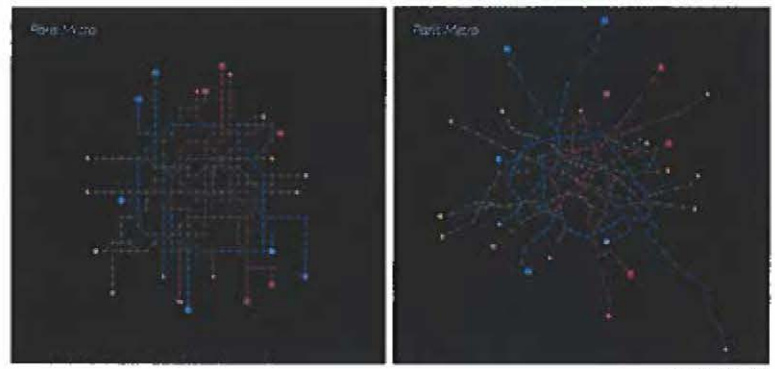


fig.31

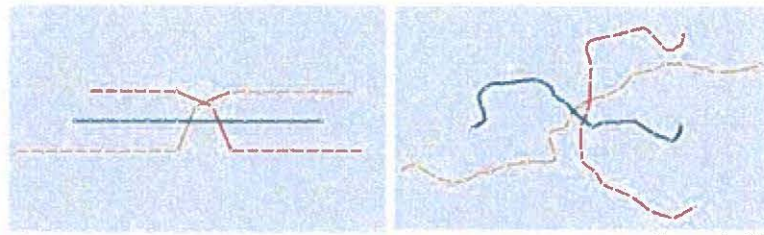
Stylization of Metro Maps

Cities' subway maps often have little connection to those cities' actual geography. For the sake of visual clarity, there maps are often altered to an inredible degree (25). This sylization is indicative of how transporation networks and thier spaces are often seen, as a means of getting from one point to the next, where the space in between is of little significance. The way true subway geography is interpreted by designers to create clear maps maps for the public says much about the mindset of those that use these transportation systems. Just like maps, subway spaces need to meet thier functional purpose, but they may be sacrificing other qualities to cater to that purpose. There is value is understanding a city's true geography as well as visual clarity, just as there is value in understanding the true culture of a city while effectively getting from place to place.

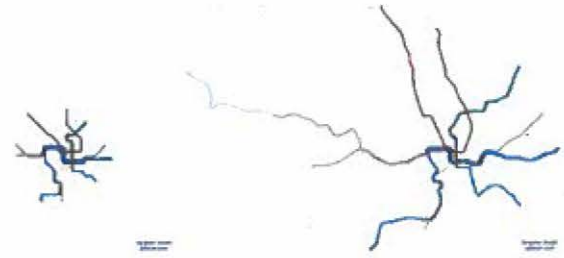
New York City fig.32



Paris fig.33



Prague fig.34



Wahington D.C. fig.35

Conclusion

The system of infrastructure that is Manhattan's subway network needs to be valued as a set of public spaces
The serve of thier functional purpose must be inherent in the design, but they are social spaces and must be treated with as much seriousness and attention that is given to other public spaces like parks and plazas. New York has in its history evidence of the integration of transportation infrastructure and cultural identiy. By looking back at its own history and looking at the precedents set by other countries and cities, Manhattan subway spaces can truely become places and beacons of the identity of the city they support.

Public spaces are always valued and high demand areas of a city, so why ignore the vast network of public space that already exists below the surface? Manhattan subway stations take on lives of thier own through performance and art, but there is a much grander opportunity to give these spaces the attention they deserve and to transform them into spaces worthy of recognition. A culture's infrastructure projects the advancements and power of a civiliaztion or city and spaces within New York's have the potential to evoke the power of the city.

03 Precedent Studies

03.1 Stockholm, Sweden

New York City's utilitarian stations with little design aesthetic are in stark contrast to the stations within Stockholm's transportation network. Often regarded as the "world's longest art gallery", 90 of the system's 100 stations boast rigged, cave like walls and ceilings adorned with paintings, art installations, mosaics, and sculptures by 150 artists. The focus of the glory of Stockholm's subway is underground, rather than in stations above ground. Spaces that still function as utilitarian infrastructure are elevated to art museums that spark curiosity and facilitate exploration deeper into the network that spans over 68 miles. There is a character, an excitement to these spaces, compared to spaces in New York City that are nothing but dark and uninviting. In addition to art, Stockholm also is home to metro stations serving as museums. The Kungstradgarden subway station houses the remains of Stockholm's Makaio's Palace. The stations offer a direct tie to the culture of the city (22).

fig.36

fig.37

fig.38

fig.39

03.2 Moscow, Russia

Upon entering the Moscow metro, the rich history is immediatly apparent. The history of the country is layered with political and architectural language. The political climate and leader at the time of each station's construction dictated its design and architectural style. They can range from art deco to neoclassical to post-modern. While there are more modern, sleek stations, many of the points within the metro network include frescoes, marble columns, and ornate chandeliers. Stalin had once refered to the metro stations as the "palaces of the people." War memorials are peppered within stations as well. The infrastructure supporting Moscow is indicative of the power and status of the country and the image leaders wanted to portray and promote to their citizens and the rest of the world. 44 of the 214 stations are historical monuments and transportations is just one of thier functions (23).

fig.40

fig.41

fig.42

fig.43

03.3 Washington D.C.

Harry Weese's brutalist metro system designed in the 1960s has a daily ridership only second to New York"s subways, yet the experience between the two is radically different. Weese stated that "the stations in the system needed to be in grand scale and needed to invoke the monumental civic architecture of federal Washington." He knew the power and status of the capitol needed to be mirrored in its supportive infrastructure. His design was awareded the AIA 25 Year Award in 2014 for withstanding the test of time to remain an iconic system.

Weese designed a kit of parts to be implemented in each of the 86 stations. The stations boast thier iconic concrete, coffered vaults and recessed lighting fixtures. The cavernous spaces within the system are captivating with some 200 feet below the city. Travellers are enthralled by the deep vaults and sculptural essence of the spaces (24).

fig.44

fig.45

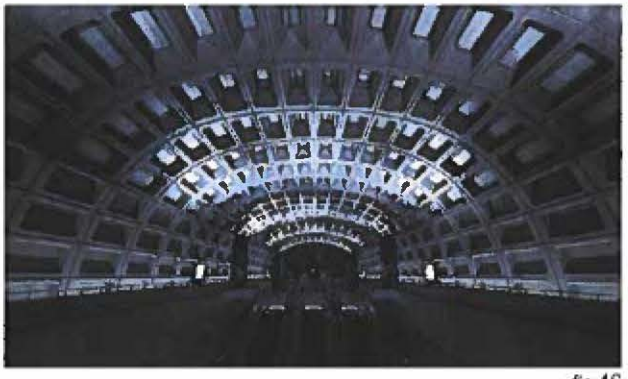
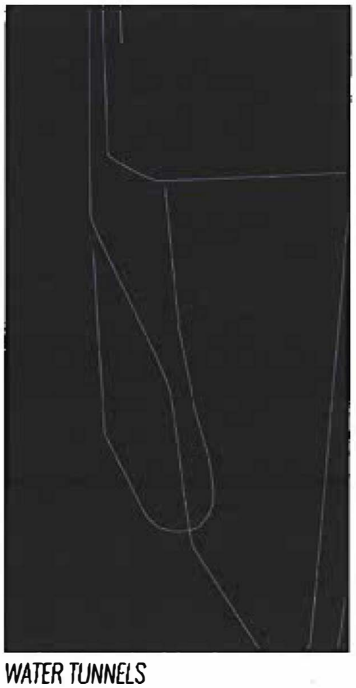


fig.46

fig.47

STREAMS AND WATER BODIES

ANTIQUATED SEWERS



WATER TUNNELS

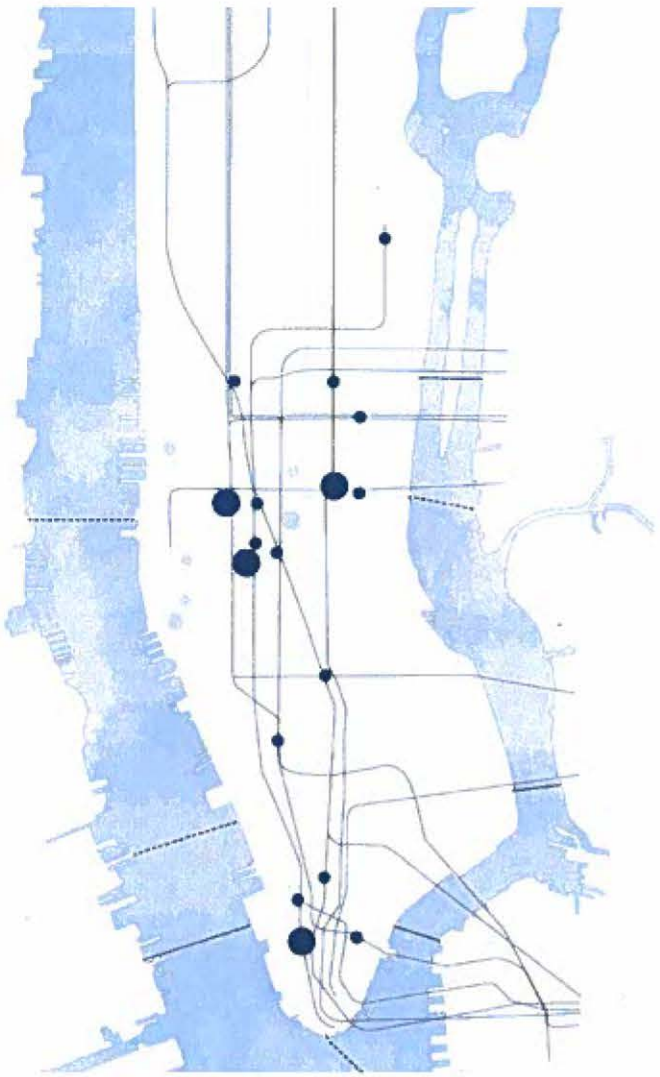
SUBWAY LINES

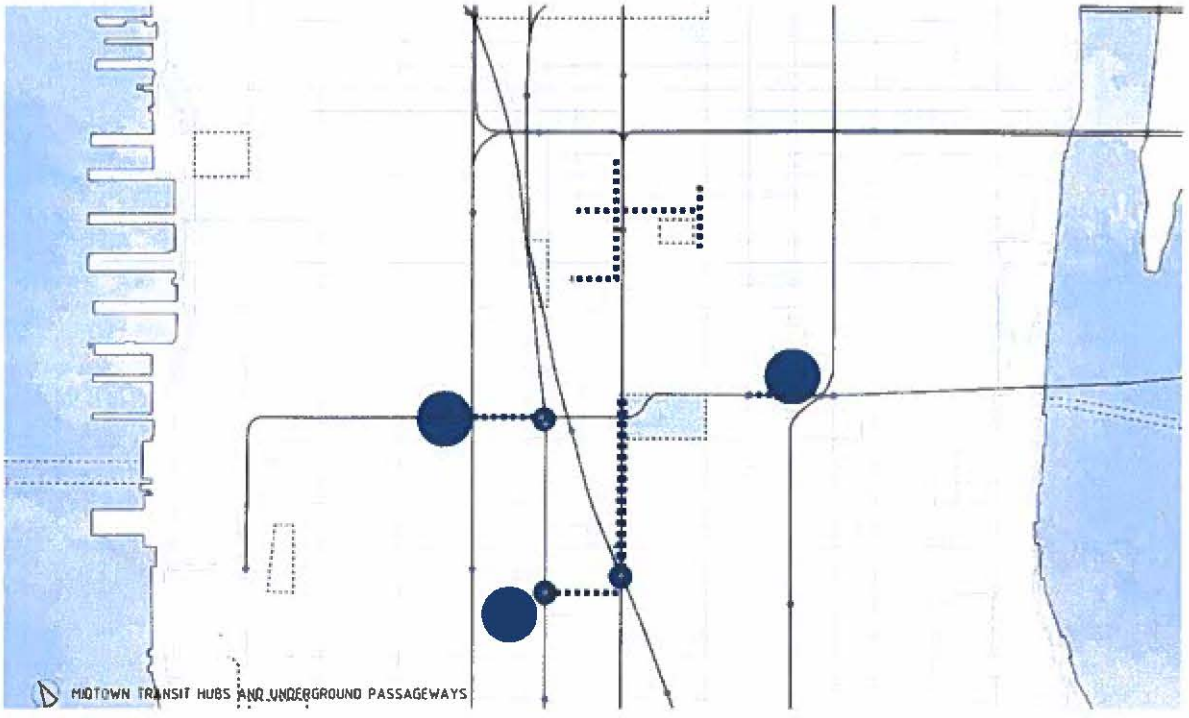
UNDERGROUND SYSTEMS IN MANHATTAN

BY AUTHOR

Site

To identify a site within Manhattan, major transit hubs and subway stops were analyzed. 3 of the largest hubs, with the highest daily ridership, are Penn. Station, Port Authority, and Grand Central Station. These three are all located in Midtown. Ammenity space in the area was then analyzed. There are several underground pedestrian walkways in this area that emphasize the pedestrian centric spaces beneath the surface.



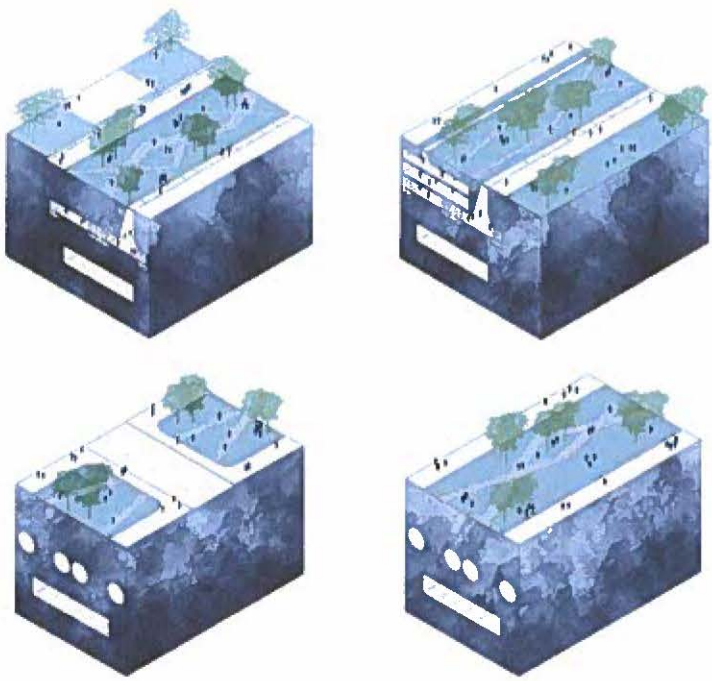

MIDTOWN TRANSIT HUBS AND UNDERGROUND PASSAGEWAYS

BY AUTHOR

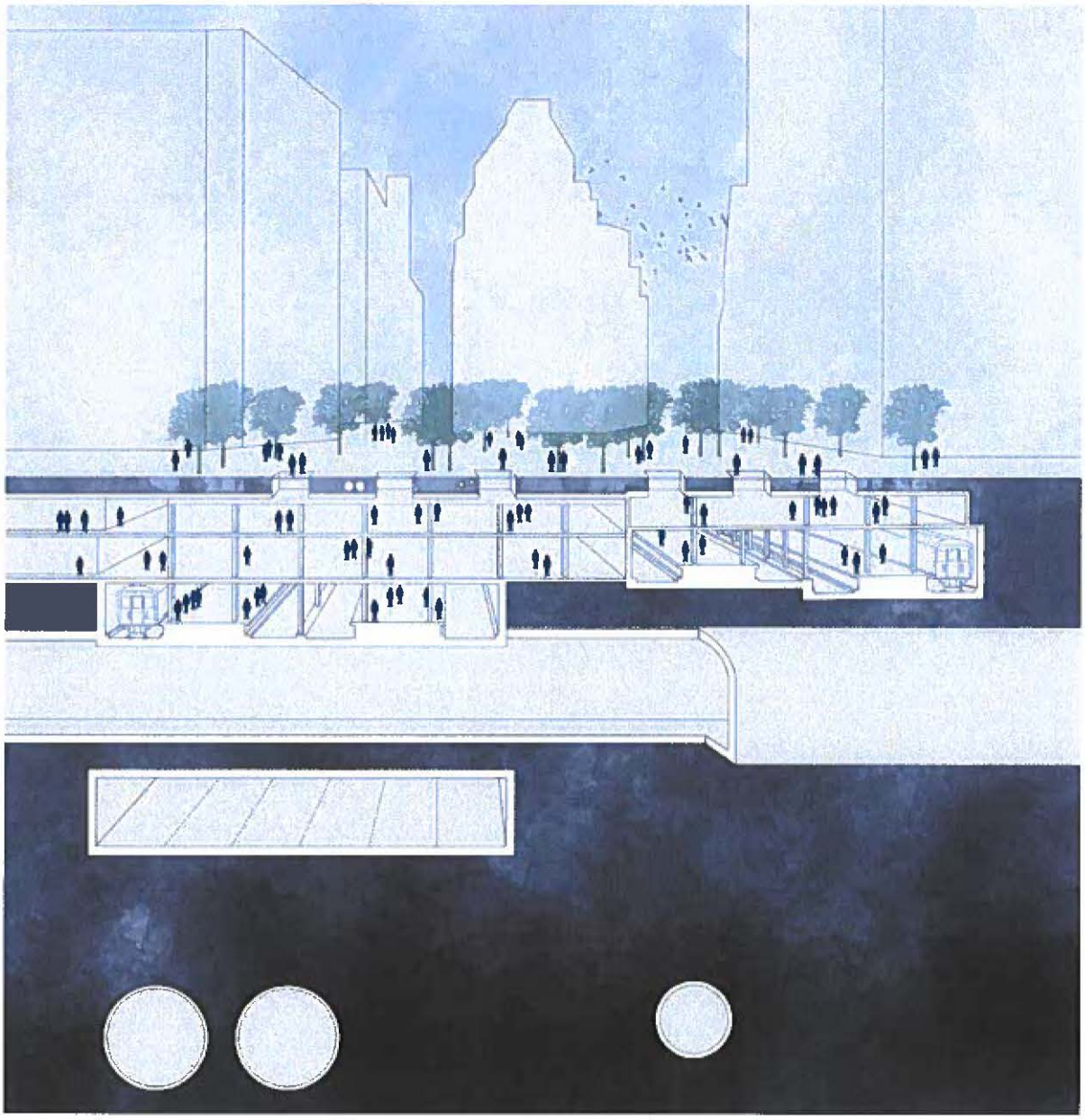
Project

The eight blocks between Bryant Park and Herald Square along 6th Avenue is where the project is situated. The corridor connects the two major park spaces and the BDFM subway lines run beneath this section of 6th Avenue.

By claiming the street above subway lines and areas above stations with a pedestrian zone, spaces within the subway network can begin to relate back to the city above. The new park sytem both visually connects down to subway spaces as well as alludes to the vast network below.



The park as a whole brings awareness to the several levels of pedestrian corridors beneath the surface and brings another level of pedestrian passage and occupation to the surface.



SECTION THROUGH 33RD ST.
BY AUTHOR

The park system spans between Bryant Park and Herald Square. It creates more than just a pocket of park space, it allows greenery to span eight full blocks.

Lightwells here bring daylight onto tracks and into subway corridors. These areas create a dialogue that is currently non-existent, between public space at the surface and public space below.

Annotated Bibliography

-Bloodworth, Sandra, and William S. Ayres. New York's Underground Art Museum: MTA Arts & Design. The Monacelli Press, 2014.

This book outlines the existing efforts for art integration into the city's subway network. It is essential to analyze existing projects and see what they have done successfully and where they are falling short. There are potentially opportunities to integrate existing design projects with a new design approach to
create an even richer environment.

-Ingraham, Christopher. "The American Commute Is Worse Today than It's Ever Been." The Washington Post, WP Co pany, 22 Feb. 2017, www.washingtonpost.com/news/wonk/wp/2017/02/22/the-american-commute is-worse today-than-its-ever-been/?utm_term=.6e29d1ec69fe.

In this article, it is discussed how longer commutes are causing a rise in the number of people who choose to work from home several days out of the week. This is a subject worth exploring as it can negatively impact the workplace and create communication barriers. The article also outlines the statistics of when commutes began to increase in length.

-Koslowsky, Meni, et al. Commuting Stress: Causes, Effects, and Methods of Coping. Springer Science+Business Media, LLC, 2013.

Kluger explains the reasons longer commutes are on the rise, as well as the effects on the individual. The effects he discusses range from family time lost to detrimental health effects. The coping methods he discusses can be applied to and help to inform the future design of commute spaces.

-Moss, Mitchell L, and Carson Qing. "Wagner NYU." Wagner NYU, wagner.nyu.edu/files/rudincenter/dynamic_pop.pdf

This paper explores the changing population of Manhattan and surrounding boroughs from day to night and weekend to weekday. It offers the a basis of research for commute numbers and statistics and delves into the reasons for these increased and dipropionate numbers.

-"Lowline Lab." The Lowline, thelowline.org/lab/.

This precedent project provides rich technological and social insight into bringing light, green space, and public space below ground. The project was a prototype installed for two years in Manhattan and provides documentation for design techniques and social implications.

Bibliography

-Dekornfeld, Ora, and Alexandra Garcia. "Your Train Is Delayed. Why?" The New York Times, The New York Times, 26 Jan. 2018, www.nytimes.com/video/nyregion/100000005550602/subway-status-emergency.html.
(Citations 1, 2, 3, 4, 5, 6)

-Dye, Steph. "Underground Art: Stockholm's Colourful Metro Stations – in Pictures." The Guardian, Guardian News and Media, 4 June 2016, www.theguardian.com/artanddesign/gallery/2016/jun/04/underground-art-stockholms-colourful-metro-stations-in-pictures.
(Citation 22)

-Fitzpatrick, Tracy. Art and the Subway: New York Underground. Rutgers University Press, 2009.
(Citations 12, 13, 14)

-"Governor Cuomo Unveils Design of Reimagined MTA Subway Cars and Details Ambitious Plan to Enhance Subway Stations." Governor Andrew M. Cuomo, 20 July 2016, www.governor.ny.gov/news/governor-cuomo-unveils-design-reimagined-mta-subway-cars-and-details-ambitious-plan-enhance.
(Citations 15, 16, 17, 18, 19)

-Hood, Clifton. 722 Miles: the Building of the Subways and How They Transformed New York. Md., 2004.
(Citation 20)

-Johnson, Matt. "Metro Has Eleven Types of Station Architecture. Learn Them All with This One Interactive Map." Greater Greater Washington, Greater Greater Washington, ggwash.org/view/36068/metro-has-eleven-types-of-station-architecture-learn-them-all-with-this-one-interactive-map.
(Citation 25)

-Kettering, Karen L. "An Introduction to the Design of the Moscow Metro in the Stalin Period: 'The Happiness of Life Underground.'" Studies in the Decorative Arts, vol. 7, no. 2, 2000, pp. 2–20., doi:10.1086/studdcoarts.7.2.40662738.
(Citation 23, 24)

-"Project Subway NYCProject Subway NYC." Project Subway NYC, www.projectsubwaynyc.com/.
(Citation 21, 26)

-Roberts, Sam. "More People Commute to Manhattan Than Any Other County." The New York Times, The New York Times, 5 Mar. 2013, cityroom.blogs.nytimes.com/2013/03/05/more-people-commute-to-manhattan-than-other-county/.
(Citations 7, 8, 9, 10, 11)